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lowed the next evening by a sumptuous banquet at the Army and Navy Club, which was attended by the Grand Dukes Constantine and Peter, as well as by many Russian officers and scientific men of high rank. The Imperial Geographical and Technical Societies held a joint session in honor of their foreign guests, which was followed by a supper. After a morning spent at the Pawlowsk Meteorological Observatory, when a *ballon-sonde* and kites were sent up from the aeronautical grounds, the Military Aeronautical Park was visited in the afternoon and here all the apparatus of the balloon corps could be inspected, including that which its commander, Colonel Kowandko, was about to take to the seat of war in Manchuria. Another day was occupied by an excursion into the Gulf of Finland on a small government-cruiser. Notwithstanding a gentle wind, the light hemispherical kites of Mr. Kusnetzof were easily raised by the motion of the vessel and proved very stable. A satisfactory demonstration was given of the writer's apparatus to determine the true and apparent wind on board. Salutes were exchanged with the Baltic fleet off Cronstadt, and this was only the second reminder that the country was at war, for no evidence of it was apparent at St. Petersburg. After the close of the conference there was an excursion to the Peterhof palace, and on the following day some of the guests were taken up in military balloons, but, unfortunately, the chief object of the ascension, a comparison of the different types of meteorological instruments, failed on account of unfavorable weather.

From the foregoing it is evident that the proverbial Russian hospitality was limited only by the brief time available. The strongest impression left by this reunion at St. Petersburg is a realization of the earnest and widespread efforts that are

being made to investigate the conditions of the high atmosphere, and it may be confidently predicted that still greater progress will have been achieved before the next international conference is convened at Rome in 1906.

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February, 1905.

#### SCIENTIFIC BOOKS.

*Food Inspection and Analysis: For the Use of Public Analysts, Health Officers, Sanitary Chemists and Food Economists.* By ALBERT E. LEACH, B.S., Analyst of the Massachusetts State Board of Health. New York, John Wiley and Sons; London, Chapman and Hall, Ltd. Cloth, 10" x 6¾". Pp. xiv + 787; 278 figs.

The foregoing title very well describes this book written by one of America's analysts of longest experience in this field of chemistry. It is not a manual of food technology or of food physiology, even to such extent as the treatise of König and Dietrich. One chapter is, indeed, entitled, 'Food, Its Functions, Proximate Constituents and Nutritive Value,' but it is given almost entirely to general definitions and classifications for the main groups of food constituents.

Neither is it a text-book of organic analysis. Little space is given to the general principles of determination for fundamental constituents or to those of the construction and use of such apparatus as the polariscope and microscope. Other special treatises, such as volume three of Wiley's 'Principles and Practise of Agricultural Analysis,' Blyth on 'Foods' and Leffmann and Beam's small book on 'Food Analysis,' devote more attention to these general subjects. They have, however, been sufficiently developed to guide the amateur to the essentials of operation and to give most helpful suggestion to the trained analyst, with special reference to the particular operations involved in this branch of food analysis.

Food inspection, its principles and the precautions necessary in its conduct are ably, though briefly, discussed. The care of samples with reference to their identification when in-

troduced as exhibits during a trial, might well have received more detailed consideration. For such as are beginning the work of executive management of a food control or the duty of sampling agent, a tabulated list of the quantities of sample needful for the several kinds of analyses would have had much value.

In discussing the methods of repressing food adulteration the author states that publication has proved a sufficient deterrent, when accompanied by prosecution in a few extreme cases. An expression somewhat contrary to this has recently been published by Director Jenkins, of the Connecticut Agricultural Experiment Station, which is the agency for food inspection in that state. Dr. Jenkins notes that publication, which has heretofore been used as the deterrent from adulteration for most foods, is proving less and less effective, and he urges the need for legislation providing for more stringent measures. The experience of the several states in the matter of fertilizer inspection has shown, on the other hand, that publication is entirely sufficient to repress the fraud once widespread in that trade. The buyer of fertilizers watches closely the inspection reports and avoids dealing with firms that conspicuously fail to meet their guaranties. While it is too early to conclude with reference to the effectiveness of publication as a deterrent from fraud in cattle foods, such inspection having been but recently established, the facts now available indicate that this means is as efficient as in case of fertilizers. It is true that both fertilizer and cattle-food laws contain penal clauses, but these are rarely, if ever, invoked. Is the admitted lack of effectiveness in repressing the adulteration of human foods due to the failure of the publications to reach the buying public—usually the housewives—or are we more indifferent respecting the adulteration of that which we ourselves eat than we are of the food intended for our cattle and our plants?

The chief aim of the book has been to aid the analyst in the detection of food adulterations. For this purpose he must not only know how to detect the presence of foreign substances, but also to interpret departures of

the common constituents from their normal proportions. Referring first to the latter requisite: While certain staple foods, such as bread, meat, milk and fruit are used by all civilized countries, the latter differ much in their choice of foods of secondary importance and in their methods of food preparation. America has her own strains of dairy cows, her own varieties of fruit and grain. She buys her imported foods in certain markets rather than in others. Her methods of food manufacture differ at many points from those adopted in other lands. For this reason, the American analyst is unable to rely with full confidence upon the bases of comparison established in German, French or even British experience, and has turned actively to the study of American foods.

Wiley and his assistants began this study years ago, and Leffmann and Beam have ably condensed and supplemented their results in the little manual, 'Food Analysis.' The past decade has witnessed great activity in this field. The Bureau of Chemistry has added much of value to its earlier work; the human nutrition investigations of the Office of Experiment Stations has contributed numerous analyses of American market products; the several agricultural experiment stations have richly increased the literature respecting milk, grains, fruits and other raw materials; and the food inspection laboratories have not confined themselves to the routine examination of food samples, but have studied carefully many of our most important food products. To its general methods of determination for the major groups of food constituents the Association of Official Agricultural Chemists has added provisional methods for the use of food inspection laboratories, and is engaged upon the formidable task of thoroughly testing them prior to their full adoption as 'official methods.' It began, a few years since, the formulation of a series of food standards for the United States. The latter work thus inaugurated, Congress has recognized and placed upon a formally official basis.

The mass of information thus gathered in American laboratories, together with the more recent developments in European food inspec-

tion, scattered through numerous books, official publications and scientific periodicals, the author has ably systematized and condensed. Few American contributions of importance seem to have escaped his notice. Nearly two hundred carefully compiled tables of composition are given, and upward of fifty tables showing the physical characters, chemical constants, etc., of food constituents, are introduced. No important class of foods has failed to receive careful consideration. In this respect, this book is better balanced than any other in this field with which the writer is familiar.

As a guide to special analytical methods the work is no less valuable. It is not an indiscriminate collection of proposed methods. Those presented have been carefully chosen, often as the result of use by the author and with notes and modifications proceeding from his experience.

The microscope as an essential instrument in food analysis is discussed with especial reference to such use, and numerous cuts portraying the histological characters of plant tissues are given, together with a fine collection of half-tones from photo-micrographs prepared by the author. The uses of the newly invented immersion refractometer are especially discussed.

Every laboratory should be planned and equipped with reference to the purposes for which it is to be used. The chapter devoted to the construction and outfitting of a food inspection laboratory contains many ingenious and helpful suggestions. The appliances for the utilization of electricity as a source of heat and power are particularly noteworthy. Throughout the book appear numerous clearly drawn cuts of apparatus, to the number of nearly one hundred. With reference to laboratory equipment, a very useful feature of the book is a list of the needed reagents, with directions for their preparation and tables of their chemical equivalents.

The worker in the field of food chemistry will find of great value the list of bibliographic references with which each chapter closes. In these lists appear not only the most important references given in the 'Ver-

einbarungen zur Untersuchung von Nahrungs- und Genussmitteln' (Berlin, 1897), compiled by a commission of German food chemists at the instance of the German Imperial Bureau of Health, but many other European references; and a very full series relating to American food literature has been added.

In literary style, the book is clear and concise. The publishers have given it an attractive typography and have illustrated it liberally and well.

To prepare so comprehensive a work without fault in detail of statement or in the selection of material would probably be impossible. Some of the criticisms that are suggested by a careful preliminary examination may be given as illustrative: In referring to 'official methods,' they are not always given in full; one of several alternate methods is occasionally described as 'official' without indication of the fact that there are alternative methods of equal official status; modifications of official methods are sometimes presented without the nature of the modification being clearly stated. Such modifications are usually of a minor character, but not always. The analyst desiring to follow the official method in all its details must, therefore, refer to the bulletins in which those methods are officially set forth.

There are a few striking omissions: No description is given, among the general methods of food analysis, of Stutzer's method for the determination of albuminoid nitrogen. No allusion is made to the methods of quantitative microscopy, nor to the use of clystering phenomena as aids to the identification of starches in mixtures. For the computation of pentosans, the older factors are given, instead of Kröber's revised factors, now generally adopted by specialists in the field of carbohydrate chemistry.

While the cuts as a whole are admirable, those for the several cereal grains, after Villiers and Collin, do not at all clearly represent the distinctive differences between the several species as respects the hairs and bran coats, tissues of especial value in distinguishing these grains when mixed. Some of the microphotographs are too poorly defined to be useful.

All considered, however, this book is the best manual on its special subject in the English language, possibly in any language. It is certain to take its place upon the reference shelves of every American food laboratory.

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*Psychology.* By JAMES ROWLAND ANGELL. New York, Henry Holt and Co. 1904. Pp. vii + 402.

No one, perhaps, is better fitted to unite in a text-book the standard 'general' psychology which James' 'Principles' represents and the results of recent experimental studies, than the author of this book. The addition of comments from the so-called 'functional' point of view will also be welcomed by the majority of qualified teachers of psychology. We feel the gratitude and satisfaction which are due to a thoroughly capable thinker who gives us a solid, careful and, so far as is desirable in a text for students, original book.

There is no need to note in detail the many excellent features in content and form or the few cases of questionable facts and methods of presentation. Every reader of this journal who is interested in the teaching of psychology should read the book itself. I choose, therefore, to comment on more general issues which it suggests.

Is it wise to divorce the experimental method from the facts of general psychology? Professor Angell's book, like other recent books for beginners, gives no sign that the student is to make any observations systematically or under the conditions of an experiment. It encourages the student to rely on reflection alone—or still worse, on mere memorizing.

Again, is it wise to follow Royce and Stout in choosing the style of the man expressing his own processes of reflection and argument rather than the crisp and objective, if somewhat bald, style of the text-book in physical science? The words *we*, *us* and *our* occur in this book apparently over three thousand times. A bald fact like 'If sense organs are stimulated, *objects*, rather than mere qualities, are felt,' appears as, "When our attention is

called to the fact, we readily notice, as was intimated earlier in the chapter, that if our sense organs are stimulated, we are commonly made conscious of *objects*, rather than of mere *qualities*, such as we have been describing in this chapter" (p. 118).

Does the so-called 'functional' point of view possess any messages of actual fact for the student other than these: (1) That mental life involves not only the existence of thoughts and feelings, but also their connections among themselves and with physical events, and (2) that mental states and their connections have been subject to natural selection? The reviewer is probably wrong, but he finds many of the comments of Professor Angell and others strangely like pure teleology or mere verbalisms. At times they seem even to attempt to explain the origin of variations (at best a ticklish business) by some inner necessity that a need should create its own satisfaction. Are such statements as the following empirical science and, even if they are, will they develop a scientific attitude in students? "Straightway appears consciousness with its accompanying cortical activities, taking note of the nature of the stimulus and of the various kinds of muscular response which it called forth" (p. 51). "Consciousness appears in response to the needs of an organism \* \* \* consciousness brings order out of this threatened chaos" (p. 52). "The organism contains within itself certain *ends* to be attained in course of development by adjustive activities. In part these ends exist imbedded in the physiological mechanisms, where they come to light as reflex, automatic and instinctive acts, sometimes accompanied by consciousness; and in part they exist as conscious purposes, in which case they appear as recognized intentions" (pp. 75-76). "Left to itself, any mental condition would convert itself at once into some kind of muscular movement" (p. 310). "We have already noted its [emotion's] appearance under conditions of stress and tension requiring new conscious coordinations in order to permit progress, and we have connected this fact with the service of emotion as a general monitor re-